

Claims

[c1] What is claimed is:

1. A method for controlling the rotation speed of an optical storage device to increase the data access rate of the optical storage device accessing an loaded optical storage medium, the method comprising:
defining a plurality of events that will probably happen during writing or reading processes of the optical storage device;
providing a weighted value corresponding to each of the plurality of events;
providing an evaluation function;
determining an initial value for the evaluation function, and a speed-up threshold and a speed-down threshold within the domain of the evaluation function, wherein the speed-up threshold and speed-down threshold divide the domain the evaluation function into a speed-up domain, a domination space, and a speed-down domain;
when one of the plurality of events happens, changing the value of the evaluation function according to the weighted value of the event;
selectively increasing the rotation speed of the optical storage device when the value of the evaluation function

lies in the speed-up domain; and
selectively decreasing the rotation speed of the optical
storage device when the value of the evaluation function
lies in the speed-down domain.

[c2] 2. The method of claim 1 further comprising:
for the evaluation function, determine the initial value,
the speed-up threshold, and speed-down threshold, all
corresponding to each rotation speed value of a plurality
of rotation speed values of the optical storage device.

[c3] 3. The method of claim 2 further comprising:
When the value of the evaluation function lies outside of
a domination space corresponding to a current rotation
speed value of the plurality of rotation speed values, se-
lectively change the rotation speed of the optical storage
device according to the size of the domination space
corresponding to the current rotation speed value and
according to the size of a domination space correspond-
ing to a target rotation speed value of the plurality of ro-
tation speed values.

[c4] 4. The method of claim 2 further comprising:
defining an adaptive function corresponding to each ro-
tation speed value of the plurality of rotation speed val-
ues, wherein the adaptive function corresponds to the
speed-up threshold and the speed-down threshold both

corresponding to the rotation speed value;
substituting the value of the evaluation function into a plurality of adaptive functions of the adaptive functions respectively to determine a maximum of values of the plurality of adaptive functions; and
determining whether the rotation speed of the optical storage device should be changed into a different rotation speed value to which the maximum corresponds by random procedures.

[c5] 5. The method of claim 1 further comprising:
providing the evaluation function corresponding to the optical storage medium, wherein the initial value, the speed-up threshold, and the speed-down threshold of the evaluation function correspond to the optical storage medium.

[c6] 6. The method of claim 1 further comprising:
Adjusting the speed-up threshold or speed-down threshold according to the latest event of the plurality of events.

[c7] 7. The method of claim 6 further comprising:
memorizing the adjusted speed-up threshold and the adjusted speed-down threshold before the optical storage medium is unloaded from the optical storage device.

- [c8] 8. The method of claim 1 further comprising:
adjusting the weighted value of one of the plurality of
events according to the appearance rate of one event of
the plurality of events.
- [c9] 9. The method of claim 1, wherein a plurality of weighted
values of the weighted values can be equal.
- [c10] 10. The method of claim 1, wherein the optical storage
device is a CD drive or a CD burner.
- [c11] 11. The method of claim 1, wherein the optical storage
device is a DVD drive or a DVD burner.
- [c12] 12. A method for controlling the rotation speed of an
optical storage device to increase the data access rate of
the optical storage device accessing an loaded optical
storage medium, the method comprising:
defining a plurality of events that will probably happen
during writing or reading processes of the optical stor-
age device;
providing an evaluation function;
for the evaluation function, determining an initial value
corresponding to each rotation speed value of a plurality
of rotation speed values of the optical storage device,
and within the domain of the evaluation function, deter-
mining a speed-up threshold and a speed-down thresh-

old both corresponding to each rotation speed value of the plurality of rotation speed values, wherein the speed-up threshold and the speed-down threshold divide the domain of the evaluation function into a speed-up domain, a domination space, and a speed-down domain;

when one of the plurality of events happens, adjusting a speed-up threshold or a speed-down threshold corresponding to a rotation speed value of the plurality of rotation speed values according to the event to change the size of a dominance space corresponding to the rotation speed value; and

selectively changing the rotation speed of the optical storage device according to the size of a domination space corresponding to a current rotation speed value of the plurality of rotation speed values and according to the size of a domination space corresponding to a target rotation speed value of the plurality of rotation speed values.

- [c13] 13. The method of claim 12 further comprising:
providing a weighted value corresponding to each of the plurality of events to divide the plurality of events into positive events and negative events respectively corresponding to positive and negative ones of the weighted values;

when one of the plurality of events happens, changing the value of the evaluation function according to the weighted value of the event;
selectively increasing the rotation speed of the optical storage device when the value of the evaluation function lies in the speed-up domain; and
selectively decreasing the rotation speed of the optical storage device when the value of the evaluation function lies in the speed-down domain.

[c14] 14. The method of claim 13 further comprising:
adjusting the weighted value of one of the plurality of events according to the appearance rate of one event of the plurality of events.

[c15] 15. The method of claim 13, wherein a plurality of weighted values of the weighted values can be equal.

[c16] 16. The method of claim 12 further comprising:
defining an adaptive function corresponding to each rotation speed value of the plurality of rotation speed values, wherein the adaptive function corresponds to the speed-up threshold and the speed-down threshold both corresponding to the rotation speed value;
substituting the value of the evaluation function into a plurality of adaptive functions of the adaptive functions respectively to determine a maximum of values of the

plurality of adaptive functions; and
determining whether the rotation speed of the optical storage device should be changed into a different rotation speed value to which the maximum corresponds by random procedures.

- [c17] 17. The method of claim 12 further comprising:
providing the evaluation function corresponding to the optical storage medium, wherein the initial values, the speed-up thresholds, and the speed-down thresholds correspond to the optical storage medium.
- [c18] 18. The method of claim 12 further comprising:
memorizing the adjusted ones of the speed-up thresholds and the speed-down thresholds before the optical storage medium is unloaded from the optical storage device.
- [c19] 19. The method of claim 12, wherein the optical storage device is a CD drive or a CD burner.
- [c20] 20. The method of claim 12, wherein the optical storage device is a DVD drive or a DVD burner.